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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/032,687

12/28/2001

Hyung Kyun Kim

29936/38063

7293

4743

7590

04/03/2003

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/032,687

Applicant(s)

KIM ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 21 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed January 21, 2003.

Claims 1-5 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on January 21, 2003 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior art in view Harakawa (JP 07-183513) (Translation).

Applicant Admitted Prior art teaches forming a polysilicon layer on an insulating film formed on a semiconductor substrate, forming a metal layer on the polysilicon layer,

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depositing a nitride film on the metal layer by a low-pressure chemical vapor deposition, and patterning the nitride film to form a hard mask. Applicant Admitted Prior art discloses patterning the metal layer and the polysilicon layer using the patterned hard mask. Applicant Admitted Prior art teaches depositing a nitride film by low-pressure chemical vapor deposition, and etching the nitride film to form a spacer at a sidewall of the patterned metal layer, the patterned polysilicon layer, and the patterned hard mask.

Applicant Admitted Prior art does not specifically teach depositing the nitride film by a low-pressure chemical vapor deposition, the hard mask and the spacer having the specific thickness as claimed. However, Harakawa teaches depositing the nitride film by low-pressure chemical vapor deposition, the nitride (hard mask) having a thickness of 100 nm (1000 Angstroms), and the nitride film for forming the spacer having a thickness of 100 nm (1000 Angstroms) (Translation, Example, page 1).

Since Applicant Admitted Prior art and Harakawa are both from the same field of endeavor of forming a gate structure, the purpose disclosed by Harakawa would have been recognized in the pertinent art of Applicant Admitted Prior art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Applicant Admitted Prior art by including the step of depositing the nitride film by low-pressure chemical vapor deposition and specifying the thickness as taught Harakawa. The modification is proper because it is within the capabilities of a person of ordinary skill in the art because low-pressure chemical vapor deposition is conventional used to deposit silicon nitride films.

5. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior art and Harakawa (JP 07-183513) (Translation) as applied to claims 1, 3, and 5 above, and further in view of Beinglass et al. (U.S. 5,932,286).

Regarding claims 2 and 4, the combination of Applicant Admitted Prior art and Harakawa fails to show using a single type chamber having a temperature of 600° C to 800° C and a pressure of 1 Torr to 500 Torr. The combination of Applicant Admitted Prior art and Harakawa fails to show using a batch type chamber having a temperature of 600° C to 800° C a pressure of 0.1 Torr to 1 Torr. However, Beinglass et al. shows depositing silicon nitride using the single type chamber having a temperature of 750° C and a pressure of 5 Torr to 100 Torr (col. 2, lines 33-55). Beinglass et al. also shows low pressure chemical vapor deposition process for the deposition of silicon nitride layers are well known in the art employing a batch-type processing chamber having a pressure of about 300 millitor (col. 1, lines 10-16).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Applicant Admitted Prior art and Harakawa by specifying the type of chamber employed, the pressure, and the temperature as taught Beinglass et al. The modification would provide highly uniform silicon nitride films (Beinglass et al., col. 2, lines 19-20).

Response to Arguments

6. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hsu et al. (U.S. 5,796,151) (of record), Lin et al. (U.S. 6,316,805) (of record), and Wu (U.S. 6,455,383) (of record) show forming silicon nitride films by Low Pressure Chemical Vapor Deposition is well known in the art.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers

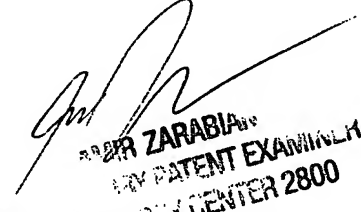
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for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

HG
MG

March 26, 2003


AMIR ZARABIAN
PATENT EXAMINER
TECHNOLOGY CENTER 2800